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98-IKU-837

IN THE UNITED STATES PATENT & TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

SERIAL NO.:	**09/831,334**
FILED:	**January 9, 2002**
FOR:	**ELECTRICALLY CONTROLLED MIRROR FOR A MOTOR VEHICLE**
APPLICANTS:	**ONNO DIRK OENEMA, PAUL WESSEL POST & MARCO RAYMOND MARIA NIJMEIJER**
ART UNIT:	**2872**
EXAMINER:	**MARK A. ROBINSON**
CONFIRMATION #:	**3239**

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5/21/07
Date

Teresa Bonsall
Teresa Bonsall

THIRD SUPPLEMENTAL APPEAL BRIEF

Sir:

Responsive to the Notification of Non-Compliant Appeal Brief mailed on March 22, 2007, Appellants submit this Third Supplemental Appeal Brief to comply with 37 CFR 41.37.

REAL PARTY IN INTEREST

Eaton Corporation, as Assignee of the entire interest of the present application, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF THE CLAIMS

Claims 1 through 26 have been cancelled.

Claims 27 through 31 are pending in the Application and stand finally rejected.

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STATUS OF AMENDMENTS

Appellants have filed an amendment under 37 CFR 1.116 for the purpose of making corrections suggested by the Examiner.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 27 is directed to an electrically controlled mirror assembly for a motor vehicle. The assembly includes a mirror housing having a build-up element 1 that defines a hollow 3 and that has a reinforcing element molded therein (Figures 1 and 2; page 7, lines 27-33). A base or support 7 supports the build-up element 1 with a electromechanical means, such as a motor 9, that folds or rotates the mirror housing relative to the support (Figure 3; page 8, lines 10-24). The electromechanical means also can adjust a mirror plate 22 relative to the housing (Figure 3; page 7, lines 29-33). An electrically operable means, such as an electronics unit 2, may be included to direct current through cores 17, 18, 19, 20, 21 to control an ancillary, such as lighting from a puddle light 33, mirror heating, and/or electrochrome dimming (Figures 2 and 3, page 9, lines 16-23). An electronics unit is disposed in the hollow 3 to control energization of the electromechanical means (Figure 3; page 9, lines 23-35).

Independent claim 31 is directed to a method of making an electrically controlled mirror by providing a support 7, forming a mirror housing with a single build-up element 1 having a hollow 3 and a reinforcing element, mounting the housing on the support and a mirror on the housing, disposing an electromechanical drive means 9 in the housing for moving the housing and the mirror, and disposing an electronics unit in the hollow for controlling movement of the mirror housing on the support and movement of the mirror on the housing.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Claims 27-30 stand rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 5,990,999 to Huizenga et al. ("Huizenga") in view of U.S. Patent No. 6,247,823 to Fuerst et al. ("Fuerst").

(2) Claim 31 stands rejected under 35 U.S.C. 103(a) as being obvious over Huizenga in view of Fuerst.

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ARGUMENT

(1) Claims 27-30 are patentable under 35 USC 103(a) over Huizenga and Fuerst

The Examiner rejected claims 27-30 as being unpatentable over Huizenga and Fuerst. The Examiner asserted that "the molded conducting strips taught by Huizenga will inherently provide a degree of reinforcement to the build-up element, thus satisfying the claimed limitation" (Final Rejection, p. 4). Appellant respectfully disagrees.

"The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. . . . In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. " MPEP 2112.

In this case, the examiner has not provided any reasoning or evidence showing that the electrical leads 68, 70, 72, 74 formed on the housing member 19 in Huizenga necessarily increase the strength and rigidity of the housing element 19. As is known in the art, thin metal conductors, such as wires, are often flexible and not rigid. Moreover, as shown in Figures 8 and 9, the material used for the housing 19 may be made thinner to accommodate the thickness of the electrical leads 74, thereby potentially reducing the strength of the housing 19. At best, the housing 19 acts as a stiffening support for the leads 68, 70, 72, 74, not the other way around (see, e.g., col. 7, lines 38-55).

In the Examiner's Answer dated November 22, 2005, the Examiner argued that when brass or copper conductors are molded into an element as taught by Huizenga, the higher tensile strength of the metal in the conductors will inherently provide some measure of increased rigidity and strength along at least one dimension of the housing element 19 (p. 7). Appellant respectfully disagrees.

The Examiner correctly noted that one embodiment of the claimed invention (i.e., claim 28) recites the reinforcing elements as being conductive strips. However, contrary to the Examiner's assertion, this does not automatically mean that incorporating metal strips in a plastic member will reinforce the member. The specification notes that, in one embodiment, the strip shaped conductor is folded over more than once and in different ways, depending on where it is located in the build-up element, to increase the rigidity and strength of the element (page 7, lines 16-28). Thus, it is clear that a metal conductor cannot be considered a reinforcement element solely because it has a higher tensile strength than plastic.

The Examiner appears to use the terms "tensile strength" and "rigidity" interchangeably when they clearly refer to different material characteristics. As is known in the art, a material with a high tensile strength may stretch and deform a great deal before breaking (i.e., have high ductility, and therefore low rigidity). A high tensile strength material can easily have less rigidity than a lower tensile strength material, particularly if it is a ductile material like copper or another conductive metal. Thus, a material with a high tensile strength does not necessarily mean that it can also increase the rigidity of a material having a lower tensile strength. Applicant has attached Appendix A to support these assertions. Appendix A explains how high tensile strength corresponds with high ductility and how ductility and rigidity are opposing characteristics.

Col. 7, lines 51-55 in Huizenga explains that molding the leads 68, 70, 72, 74, the wires 84, 84 and 88, and their connections 92 in the housing 19 eliminates vibrations that could potentially jeopardize a conventional connection (which would flex and move without the support of the housing 19). This interpretation is consistent with the fact that the higher tensile strength (and resulting greater flexibility) of the conductors require the support of the stiffer housing 19 to ensure that vibrations do not flex the wires and break the connections 92.

The simple fact that Huizenga shows conductors on a housing, without more, cannot render the claimed invention obvious. The Examiner has not shown that placing electrical leads made of high tensile strength material on an element necessarily increases the rigidity and strength of that element, particularly when a high tensile strength material stretched into a wire is so inherently flexible and can be so soft that it adds nothing to the rigidity of the housing. Nothing in Huizenga indicates that the electrical leads add any rigidity or strength of the housing 19. Instead, Huizenga clearly shows the opposite, that the leads need the rigidity of the housing 19 to protect them from damage due to vibrations. At best, the rigidity and strength of the housing 19 is dictated by the housing material, with the leads having virtually no effect on the rigidity of the housing. Thus, the metal leads in Huizenga do not teach or suggest the claimed reinforcing element.

The Examiner also admitted that Huizenga does not disclose the claimed electromechanical means or the claimed electronics unit, but argued that it would have been obvious to include an electronics unit in a hollow of a mirror-build-up element as taught by Fuerst to protect the electronics unit. The Examiner also clarified that Fuerst is

relied upon for teaching a printed circuit board. Appellant thanks the Examiner for the clarification. Appellant notes that adding Fuerst to Huizenga still fails to render the claimed invention obvious because Fuerst does not show a reinforcement insert at all. Because neither Huizenga nor Fuerst shows the claimed reinforcement element insert in the build-up element, the final rejection of claims 27-30 should be withdrawn.

<u>(2) Claim 31 is patentable under 35 USC 103(a) over Huizenga and Fuerst</u>

Independent method claim 31 recites steps that include insert molding a reinforcement in the build-up element of the mirror housing, disposing an electromechanical drive means on the mirror housing, and disposing an electronics unit in a hollow in the mirror housing. As explained above, neither Huizenga nor Fuerst disclose incorporating a reinforcement element of any kind into a mirror assembly, and there is no motivation to combine Huizenga with Fuerst. The final rejection of claim 31 is therefore improper and should be withdrawn.

Accordingly, it is requested that the Board reverse the Examiner's rejection and allow the claims to be issued.

Respectfully submitted,

Dated: 05/21/2007

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CLAIMS APPENDIX

27. An electrically controlled mirror assembly for a motor vehicle comprising:
    (a) a support adapted for mounting on a vehicle;
    (b) a mirror housing moveably associated with said support comprising a single build-up element formed of non-conductive material with a reinforcing element insert molded therein for increasing the rigidity and strength of the build-up element, said build-up element defining a hollow;
    (c) a mirror plate moveably associated with the housing;
    (d) electromechanical means operable upon energization for adjusting said housing relative to said support and for adjusting said mirror plate relative to said housing;
    (e) means operable upon electrical energization for performing an ancillary function; and,
    (f) an electronics unit received in said hollow for controlling said energization for said adjusting.

28. The assembly defined in claim 27, wherein said reinforcing elements comprise electrically conductive strips.

29. The assembly defined in claim 27, wherein said electronic unit includes a printed circuit board.

30. The assembly defined in claim 27, wherein said support includes a mounting base having a hollow shaft adapted for having electrical cables pass therethrough.

31. A method of making an electrically controlled mirror for a motor vehicle comprising:
    (a) providing a support;
    (b) forming a mirror housing comprising a single build-up element of non-conductive material and insert molding therein a reinforcement for increasing rigidity and strength of the build-up element;

(c) forming a hollow in said build-up element;

(d) mounting the housing on the support for movement thereon and mounting a mirror on the housing for movement thereon;

(e) disposing electromechanical drive means on said housing for effecting said movement; and,

(f) disposing an electronics unit in said hollow for controlling the movement of said mirror housing on said support and the movement of said mirror on said housing.

EVIDENCE APPENDIX

Applicant has not submitted any evidence under 37 CFR §§ 1.130, 1.131, or 1.132 in this application.

RELATED APPEALS AND INTERFERENCES APPENDIX

There are no related appeals or interferences for this application. Thus, there are no decisions that will affect or be affected by the outcome of this appeal.

APPENDIX A

tensile strength

Dictionary

American Heritage® dic·tion·ar·ies

tensile strength
n. (*Abbr.* TS)

The resistance of a material to a force tending to tear it apart, measured as the maximum tension the material can withstand without tearing.

WordNet

Note: click on a word meaning below to see its connections and related words.

The *noun* tensile strength has one meaning:

Meaning #1: the strength of material expressed as the greatest longitudinal stress it can bear without tearing apart

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Wikipedia

tensile strength

The **tensile strength** of a material is the maximum amount of tensile stress that it can be subjected to before it "fails". The definition of failure can vary according to material type and design methodology. This is an important concept in engineering, especially in the fields of material science, mechanical engineering and structural engineering.

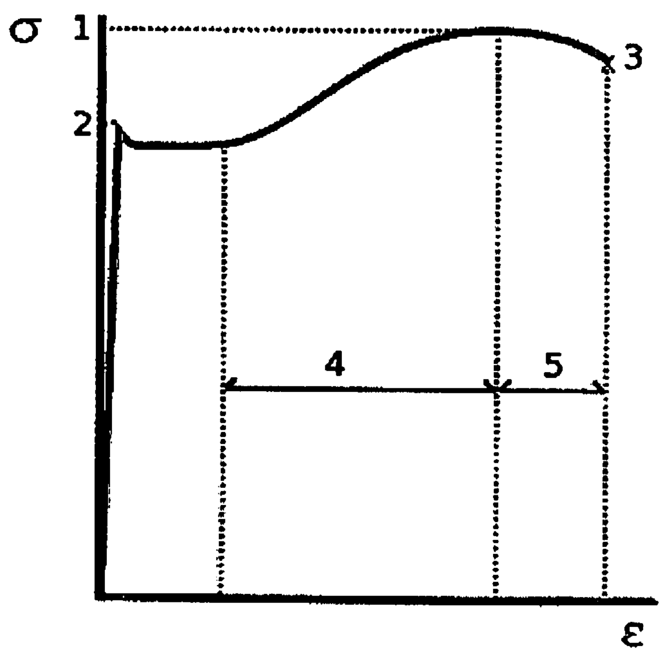
(In plain English, "tensile strength" measures the amount that something (e.g., rope, wire) can be drawn or pulled apart before it breaks.)

There are three typical definitions of tensile strength:

- Yield Strength - The stress a material can withstand without permanent deformation.
- Ultimate Strength - The maximum stress a material can withstand.
- Breaking Strength - The stress coordinate on the Stress-strain curve at the point of rupture.

Concept

The various definitions of tensile strength are shown in the the following stress-strain graph for low-carbon steel:



Stress vs. Strain curve typical of structural steel
1. Ultimate Strength
2. Yield Strength
3. Rupture
4. Strain hardening region
5. Necking region.

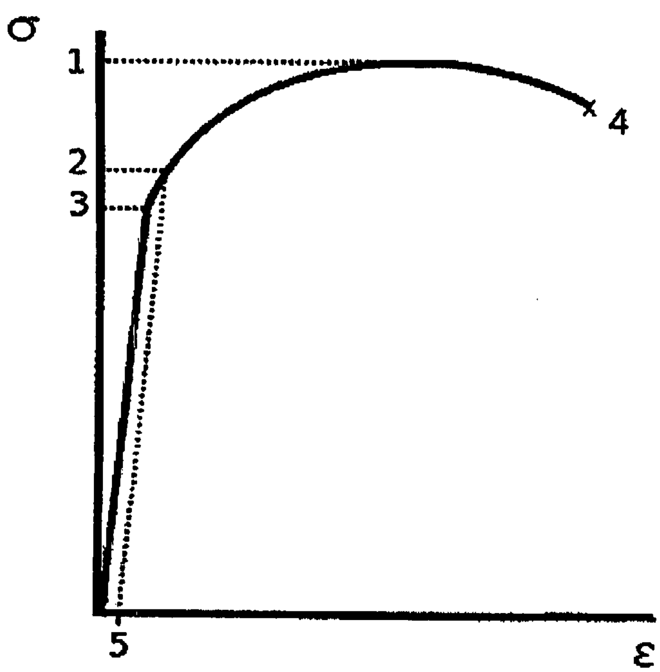
Steel has a very linear stress-strain relationship up to a sharply defined yield point, as shown in the figure.

For stresses below this yield strength all deformation is recoverable, and the material will relax into its initial shape when the load is removed. For stresses above the yield point, a portion of the deformation is not recoverable, and the material will not relax into its initial shape. This unrecoverable deformation is known as plastic deformation. For many applications plastic deformation is unacceptable, and the yield strength is used as the design limitation.

After the yield point, steel and many other ductile metals will undergo a period of strain hardening, in which the stress increases again with increasing strain up to the *ultimate strength*. If the material is unloaded at this point, the stress-strain curve will be parallel to that portion of the curve between the origin and the yield point. If it is re-loaded it will follow the unloading curve up again to the ultimate strength, which has become the new yield strength.

After steel has been loaded to its ultimate strength it begins to "neck" as the cross-sectional area of the specimen decreases due to plastic flow. Necking is accompanied by a region of decreasing stress with increasing strain on the stress-strain curve. After a period of necking, the material will rupture and the stored elastic energy is released as noise and heat. The stress on the material at the time of rupture is known as the *breaking stress*. Note that if the graph is plotted in terms of *true stress* and *true strain* necking will not be observed on the curve as true stress is corrected for the decrease in cross-sectional area. Necking is also not observed for materials loaded in compression.

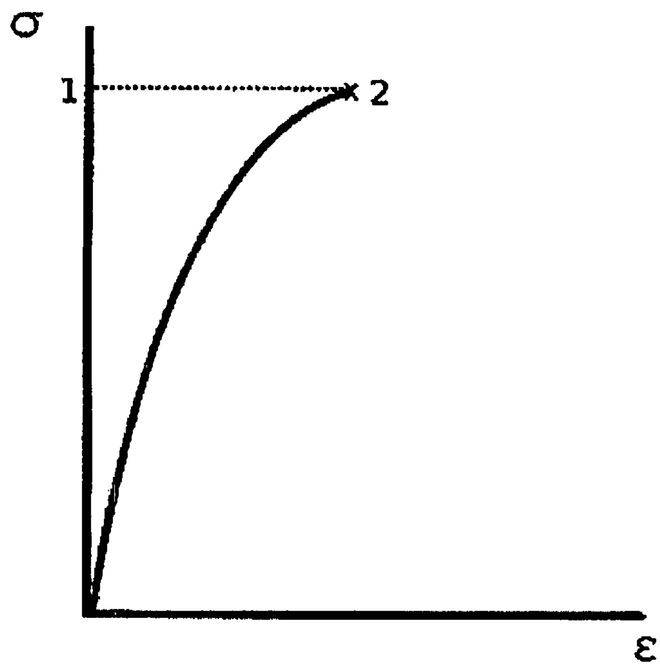
Ductile metals other than steel typically do not have a well defined yield point. For these materials the yield strength is typically defined by the "0.2% offset strain". The yield strength at 0.2% offset is determined by finding the intersection of the stress-strain curve with a line parallel to the initial slope of the curve and which intercepts the abscissa at 0.002. A stress-strain curve typical of Aluminum along with the 0.2% offset line is shown in the figure below.



Stress vs. Strain curve typical of aluminum
1. Ultimate Strength
2. Yield Strength
3. Proportional Limit Stress
4. Rupture

5. Offset Strain (typically 0.002).

Brittle materials such as concrete and carbon fiber do not have a yield point, and do not strain-harden which means that the ultimate strength and breaking strength are the same. A stress-strain curve for a typical brittle material is shown in the figure below.



Stress vs. Strain curve typical of a brittle material
1. Ultimate Strength
2. Rupture.

Tensile strength is measured in units of force per unit area. In the SI system, the units are newtons per square metre (N/m^2) or pascals (Pa), with prefixes as appropriate. The non-metric units are pounds-force per square inch (lbf/in^2 or PSI).

The breaking strength of a rope is specified in units of force, such as newtons, without specifying the cross-sectional area of the rope. This is often loosely called tensile strength, but this not a strictly correct use of the term.

In brittle materials such as rock, concrete, cast iron, or soil, tensile strength is negligible compared to the compressive strength and it is assumed zero for most engineering applications. Glass fibers have very high tensile strength, but bulk glass usually does not.

Tensile strength can be measured for liquids as well as solids. For example, when a tree draws water from its roots to its upper leaves by transpiration, the column of water is pulled upwards from the top by capillary action, and this force is transmitted down the column by its tensile strength. Air pressure from below also plays a small part in a tree's ability to draw up water, but this alone would only be sufficient to push the column of water to a height of about ten metres, and trees can grow much higher than that. (See also cavitation, which can be thought of as the consequence of water being "pulled too hard".)

Typical tensile strengths

Some typical tensile strengths of some materials:

Material	Yield strength (MPa)	Ultimate strength (MPa)	Density (g/cm^3)
Structural steel ASTM-A36	250	400	
Steel, high strength alloy ASTM A-514	690	760	
Steel, high tensile	1650	1860	
Piano wire		2000	
Polypropylene	12-43	19.7-80	
Stainless steel AISI 302 - Cold-rolled	520	860	
Cast iron 4.5% C, ASTM A-48	-	170	
Titanium Alloy (6% Al, 4% V)	830	900	4.51
Aluminum Alloy 2014-T6	400	455	2.7
Copper 99.9% Cu	70	220	8.92
Cupronickel 10% Ni, 1.6% Fe, 1% Mn, balance Cu	130	350	8.94
Brass		250	
Glass (St Gobain "R")	4400 (3600 in composite)		2.53
Marble	-	15	
Concrete	-	3	
Spider silk	1150 (??)	1200	
Silkworm silk			
Kevlar	3620		1.44
Vectran		2850-3340	
Pine Wood (parallel to grain)		40	
Bone (limb)		130	
Nylon, type 6/6	45	75	
Rubber	-	15	
Boron	3100		2.46
Silicon carbide (SiC)	3440		
Sapphire (Al_2O_3)	1900		3.9-4.1

Single-walled carbon nanotubes have the highest tensile strength of any material yet measured, with the highest single measurement of a nanotube being 63 GPa (63000 MPa). As of 2004, however, no macroscopic object constructed using a nanotube-based material has had a tensile strength remotely approaching this figure, or substantially exceeding that of high-strength materials like Kevlar.

Sources

- Giancoli, Douglas. Physics for Scientists & Engineers Third Edition. Upper Saddle River: Prentice Hall, 2000.
- Köhler, T. and F. Vollrath. 1995. Thread biomechanics in the two orb-weaving spiders *Araneus diadematus* (Araneae, Araneidae) and *Uloboris walckenaerius* (Araneae, Uloboridae). Journal of Experimental Zoology 271:1-17.

Further information

See also

- Vertical strength
- Toughness
- Deformation

External links

- Tensile Strength Test
- January 2003 sci.physics thread on water tensile strength and trees and stuff
- Theory re the discrepancy in static vs dynamic measurements of water's tensile strength
- Engineering Stress-strain Curve
- Analytical Process Laboratories
- Tensile Strength Testing

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- elastic limit
- compressive strength
- monocrystalline whisker
- Elektron (alloy)
- tensiometer
- Gray Iron
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Ductility \Duc*til"i*ty\, n. [Cf. F. ductilit['e].]

1. The property of a metal which allows it to be drawn into wires or filaments.

2. Tractableness; pliableness. --South.

Source: Webster's Revised Unabridged Dictionary (1913)

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Rigidity \Ri*gid"i*ty\, n. [L. rigiditas: cf. F. rigidit['e]. See Rigid.]

1. The quality or state of being rigid; want of pliability; the quality of resisting change of form; the amount of resistance with which a body opposes change of form; -- opposed to flexibility, ductility, malleability, and softness.

2. Stiffness of appearance or manner; want of ease or elegance. --Sir H. Wotton.

3. Severity; rigor. [Obs. orR.]

--Bp. Burnet.

Syn: Stiffness; rigidness; inflexibility.

Source: Webster's Revised Unabridged Dictionary (1913)

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